

**IN THE UNITED STATES DISTRICT COURT  
WESTERN DISTRICT OF TEXAS  
WACO DIVISION**

UNM RAINFOREST INNOVATIONS,

Plaintiff,

v.

GLOBALFOUNDRIES INC.,  
GLOBALFOUNDRIES U.S. INC.,  
and GLOBALFOUNDRIES U.S. 2 LLC,

Defendants.

Civil No. 6:20-CV-243-ADA

Jury Trial Demanded

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**DEFENDANTS' RESPONSIVE CLAIM CONSTRUCTION BRIEF**

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<b>Exhibit No.</b>	<b>Description</b>
Ex. 8	U.S. Patent Application Publication No. 2011/0140085 (“Homyk”)
Ex. 9	Preliminary Constructions for STC.UNM v. Samsung and TSMC (Mar. 12, 2020)
Ex. 10	U.S. Patent Application 16/746,853 (the “’853 application”) (STC.UNM0009802-9887)

## I. INTRODUCTION

Defendants GLOBALFOUNDRIES Inc., GLOBALFOUNDRIES U.S. Inc., and GLOBALFOUNDRIES U.S. 2 LLC (collectively, “Defendants”) submit their Responsive Claim Construction Brief to Plaintiff UNM Rainforest Innovations’ Opening Claim Construction Brief (ECF No. 34<sup>1</sup>). Plaintiff relies on a contorted interpretation of claim 1 that contradicts the language of the claim and the specification to argue that the steps of the claimed method do not have to be performed in the order they are recited. Moreover, Plaintiff’s argument that the steps do not have to be performed in the recited order does nothing to resolve the indefiniteness of the claim. Though Plaintiff does not dispute that Defendants’ constructions of “heteroepitaxial layer” and “selective growth mask layer” are technically accurate, it still argues that the jury does not need these accurate constructions. Defendants’ proposed constructions should be adopted.

## II. ARGUMENT

### A. Order of Performing the Steps of the Claimed Method

Plaintiff does not dispute that most of the steps of claim 1 must be performed in the order they are recited. Plaintiff admits that Steps 1, 3, 4, and 6 must be performed in order. *See* ECF No. 34 at 11 (“[S]tep [6] . . . must be performed after steps [3] and [4]. . . . [S]tep [1] likely must be performed first.”).<sup>2</sup> Plaintiff also admits that the first half of Step 2 must be performed after Step 1 but before Step 3.<sup>3</sup> *See id.* at 11-12. However, Plaintiff argues that the following two

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<sup>1</sup> “ECF No.” refers to docket for this matter unless otherwise indicated. The cited page number refers to the page number of the underlying document.

<sup>2</sup> Plaintiff refers to Steps 1-6 of claim 1 identified by Defendants as steps [a]-[f]. *See* ECF No. 34 at 10-11; GLOBALFOUNDRIES Opening Br., ECF No. 35, at 5-6, Tbl. 1.

<sup>3</sup> The first half of Step 2 refers to the limitation “forming a nanostructured pedestal on the semiconductor substrate, the pedestal having a top surface and a side surface,” and the second half of the step refers to the limitation “the top surface forming a seed area having a linear surface dimension that ranges from about 10 nm to about 100 nm.” ’400 patent, claim 1.

limitations of claim 1 do not have to be performed in the order they are recited:

- first, Plaintiff argues that the second half of Step 2 merely “discloses *what* ultimately will be formed” and need not be performed as part of Step 2, *see id.* at 11-12 (emphasis in original); and
- second, though Plaintiff admits that Step 5 follows Step 4, it argues that Step 5 alternatively can be performed before Step 3. *See id.* at 13.

As Defendants explained in their opening brief, the grammar and the structure of claim 1 dictate that the steps of the claim be performed in the order they appear in the claim. *See* ECF No. 35 at 4-9. Neither of the two exceptions to that order Plaintiff seeks has any merit.

**1. Plaintiff Mischaracterizes Part of Step 2 as Preamble-Like Language to Step 3 and Step 4**

Even though Plaintiff admits that the first half of Step 2 is performed after Step 1 but before Step 3, it nevertheless argues that the second half of the same step is not subject to the same constraints. Plaintiff argues that the “top surface forming a seed area” term merely “discloses *what* ultimately will be formed” by Steps 3 and 4. ECF No. 34 at 11 (emphasis in original). Even though Step 2 is a limitation of claim 1, Plaintiff nevertheless contends that the second half of step 2 is “*not a step that must be performed*—it is description of a result yielded by the claimed method.” *Id.* at 12 (emphasis added). In other words, Plaintiff essentially treats the “forming a seed area” term as a preamble to Steps 3 and 4 because, according to Plaintiff, the term merely describes the purpose of those subsequent steps. Plaintiff contends, as a result, that the second half of Step 2 does not circumscribe the pedestal formed in Step 2.<sup>4</sup> Plaintiff’s

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<sup>4</sup> “In general, a preamble limits the invention if it recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim.” *Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC*, 962 F.3d 1362, 1367 (Fed. Cir. 2020) (internal quotation marks omitted). “Conversely, a preamble is not limiting where a patentee defines a structurally complete

interpretation that second half of Step 2 is *not a step that must be performed* is flawed for several reasons.

First, Plaintiff's interpretation does not accord with a plain reading of the claim language. Step 2 clearly recites a step of *forming* a pedestal having certain properties, requiring:

- *forming* a nanostructured pedestal on the semiconductor substrate,
- the pedestal having a top surface and a side surface, and
- the top surface of the pedestal *forming* a seed area with certain dimensions.

The plain meaning of the claim requires *forming* a pedestal and its top surface *forming* a seed area at the conclusion of Step 2. Plaintiff fails to proffer any cogent reason to depart from that plain meaning.<sup>5</sup> See *Poly-Am., L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016) (“We depart from the plain and ordinary meaning in only two instances. The first is when a patentee acts as his own lexicographer. The second is when the patentee disavows the full scope of the claim term in the specification or during prosecution.”) (internal citations omitted).

Second, by interpreting the second half of Step 2 as merely enumerating the purpose of subsequent steps, Plaintiff renders the term superfluous and violates a basic canon of claim construction. Plaintiff's argument that the “top surface forming a seed area” is “not a step that must be performed” and relates to “*what* ultimately will be formed” eviscerates all meaning and substance of that term. See ECF No. 34 at 11-12 (emphasis in original). Such a construction cannot be correct. See *Digital-Vending Servs. Int'l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012) (“[C]laims are interpreted with an eye toward giving effect to all terms in

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invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.” *Id.* (internal quotation marks omitted). To the extent Plaintiff argues that the second half of Step 2 is like a limiting preamble, then the second half of Step 2 should define the pedestal at that stage and not a Step 4.

<sup>5</sup> Notably, Plaintiff does not cite any legal authority to support its argument that part of a limitation can be ignored without any legitimate justification.

the claim. In *Phillips*, this court reinforced the importance of construing claim terms in light of the surrounding claim language, such that words in a claim are not rendered superfluous.”) (internal citations and quotation marks omitted). Instead, entire Step 2 specifies what must exist when the pedestal is formed in that step.

Third, Plaintiff improperly attributes different meanings with varying temporal attributes to the “forming” term that occurs twice in the same step. *See* ECF No. 34 at 11-12. Plaintiff argues that the first occurrence of “forming” (“*forming* a . . . pedestal”) is an active step that occurs during Step 2 and creates a pedestal whereas the second occurrence of “forming” (“top surface *forming* a seed area”) may impact steps that occur later in time. *See id.* Plaintiff does not offer any explanation as to why the same term that occurs twice in the same step should have effect at different stages of the method claim. *See Phonometrics, Inc. v. N. Telecom Inc.*, 133 F.3d 1459, 1465 (Fed. Cir. 1998) (“A word or phrase used consistently throughout a claim should be interpreted consistently.”). Absent any intrinsic evidence to the contrary, every usage of the “forming” term in Step 2 should be interpreted consistently—the first *forming* term forms the pedestal and the second *forming* term makes the top surface form “a seed area.”

## **2. File History Requires that a Pedestal with a “seed area” Is Formed in Step 2**

The prosecution history confirms that “a seed area” is formed as a result of Step 2. During prosecution, the examiner relied on U.S. Patent Application Pub. No. 2011/0140085 (“Homyk”) to reject pending claim 14 in the application that issued as the ’400 patent. Paragraph 27 of Homyk states:

Lithography and highly anisotropic etching enables routine fabrication of 30-50 nm nanostructures (100) in silicon with over 40:1 aspect ratios as shown in FIG. 1. Such structures can be further reduced in diameter by a subsequent thermal oxidation, wherein the oxidation process can be designed to self-terminate



such that nanoscale pillars below 10 nm in width can be defined, allowing wide processing latitude.

Ex. 8, Homyk, ¶ 27. The examiner stated that paragraph 27 of Homyk discloses:

forming a nanostructured pedestal [] on the semiconductor substrate, the pedestal having a top surface and a side surface, the top surface forming a seed area having a linear surface dimension that ranges from about 10 nm to about 100 nm.

Ex. 5, Non-Final Rejection (Nov. 3, 2014), ECF No. 35-5, at 4. In other words, the examiner mapped the 30-50 nm nanostructures mentioned in paragraph 27 of Homyk against nanostructured pedestals with a 10-100 nm seed area formed by Step 2. Homyk also states that “[s]uch structures can be further reduced in diameter by a subsequent thermal oxidation” and “nanoscale pillars below 10 nm in width can be defined.” Ex. 8, ¶ 27. Plaintiff admits that the thermal oxidation step corresponds to Step 3 in the Figure 2 embodiment. ECF 34 at 12-13. If the dimension of the nanostructures in Homyk is measured after the steps that correspond to Steps 3 and 4, that dimension could be outside the claimed dimension of about 10-100 nm. Thus, the examiner’s rejection was based on an understanding that a seed area having a dimension of about 10-100 nm is formed in Step 2. Otherwise, the examiner would not have mapped paragraph 27 of Homyk to Step 2. Notably, Plaintiff did not dispute the examiner’s conclusion that Homyk discloses “a seed area” with a 10-100 nm linear dimension before Steps 3 and 4. *See* Ex. 6, Reply to Non-Final Rejection (Feb. 2, 2015), ECF No. 35-6, at 4-5, 9-10 (amending pending claim 14 to add a limitation that the length is 2 or more times longer than the width).

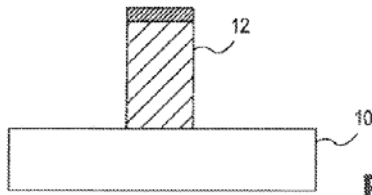
### **3. Defendants’ Construction is Consistent with the Embodiment Disclosed in Figure 2**

In order to support its flawed interpretation, Plaintiff argues that Defendants’ construction risks excluding the embodiment shown in Figures 2A-F because Defendants’ construction requires that “the seed area would have had to exist several steps before Step 2E.” *See* ECF No.

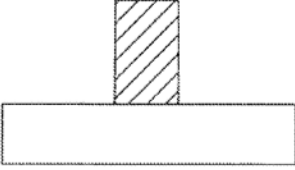
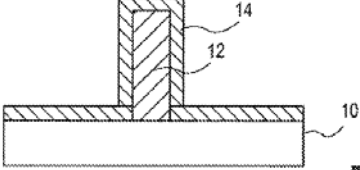
34 at 12-13. Plaintiff argues that pedestal 12 depicted in Figure 2B lacks a seed area because the top surface of the pedestal is covered by an etch mask 22 and is then next depicted as covered by a selective growth mask layer 14 in Figure 2C. *See id.* at 12. Plaintiff fails to recognize that the specification describes that the top surface of the pedestal is exposed between Figure 2B and 2C.<sup>6</sup>

The specification and the claim demonstrate that a seed area does exist after the formation of the pedestal 12 in Figure 2B but before the selective growth mask layer 14 is provided in Figure 2C. As shown below, the top surface of the pedestal in Figure 2B has an etch mask 22 whereas Figure 2C lacks the etch mask 22; rather, the selective growth mask layer 14 in Figure 2C is formed directly on the top surface of the pedestal:

**Table 1**

Specification	Figure
"Using the etch mask 22, the silicon substrate can be patterned by etching to form the pedestal 12, as illustrated in FIG. 2B." '400 patent at 6:51-53.	

<sup>6</sup> Plaintiff cites *Interactive Gift Exp., Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1344 (Fed. Cir. 2001), stating that it “reject[ed] argument that claims must be performed in the order recited because such a construction would not read on the preferred embodiment.” ECF No. 34 at 13. But unlike *Interactive*, there is no dispute in this case that if the claim is construed to require that the steps be performed in order, the claim would read on at least one of the preferred embodiments, *i.e.*, the embodiment disclosed in Figure 1. *See Pacing Techs., LLC v. Garmin Int’l, Inc.*, 778 F.3d 1021, 1026 (Fed. Cir. 2015) (“[I]n a case such as this, where the patent describes multiple embodiments, every claim does not need to cover every embodiment.”). Regardless, consistent with Defendants’ construction, a seed area exists before Figure 2C.

<p>“Following etching, the etch mask 22 can be removed.” ’400 patent at 6:56.</p>	 <p><b>[Illustrative FIG. 2B-1]</b></p>
<p>“In an embodiment, thermal oxidation can then be carried out to form a selective growth mask layer 14 of silicon dioxide to a desired thickness.” ’400 patent at 6:56-59.</p>	 <p><b>FIG. 2C</b></p>

The specification explains that after the pedestal is formed in Figure 2B, the etch mask 22 is removed before providing the selective growth mask layer 14 in Figure 2C. *See* ’400 patent at 6:56 (“Following etching, the etch mask 22 can be removed.”). Illustrative Figure 2B-1 in Table 1 above provides a depiction of this intermediate structure without the etch mask 22. The uncovered top surface of the pedestal exists before the selective growth mask layer 14 is formed on the pedestal 12. The top surface of the pedestal in Figure 2B-1 forms “an area on which the epitaxial growth could occur” and constitutes a “seed area” under the Court’s construction. *See* Ex. 9, Preliminary Constructions for *STC.UNM v. Samsung and TSMC* (Mar. 12, 2020). Therefore, the Figures 2A-F embodiment involves forming a seed area before Step 3.

In fact, Plaintiff’s statements prove that the etch mask 22 is removed and a seed area is formed after the step of Figure 2B but before the step of Figure 2C. Plaintiff states that “Figure 2C shows the formation of a selective growth mask layer (14) on the pedestal using thermal oxidation, which consumes some of the pedestal material.” ECF No. 34 at 12 (citing ’400 patent at 6:56-64). If the etch mask 22 is not removed from the pedestal 12 and the top surface is not

exposed to form a seed area, then the selective growth mask layer 14 cannot be formed on the pedestal 12 as shown in Figure 2C in the manner described by Plaintiff.

Other parts of the claim also demonstrate that the etch mask 22 must be removed from the pedestal 12 before the selective growth mask layer 14 is provided. Step 4 requires removing a portion of the selective growth mask layer 14 to expose the seed area. *See* '400 patent, claim 1. If the etch mask 22 were not removed from the pedestal, then the removal of the selective growth mask layer 14 would result in exposing the etch mask 22 and not the top surface of the pedestal.

In conclusion, Plaintiff is incorrect when it argues that a “seed area” is not formed before Step 2C in the embodiment disclosed in Figure 2.

**4. Contrary to Plaintiff’s Assertion, Step 5 Must Be Performed After Step 4 and Cannot be Performed Before Step 3**

Plaintiff argues that Step 5 can occur before Step 3 to fashion the pedestal after Step 2 and thus, the steps need not be performed in the recited order. Plaintiff is incorrect on many grounds.

First, Plaintiff’s argument about the order of steps contradicts its own description of claim 1. Specifically, Plaintiff admits that “[t]he seed area is selectively exposed by removing a portion of the selective growth mask layer, and *then* etched back.” ECF No. 34 at 3 (emphasis added); *see also* Case no. 6:19-cv-261-ADA, Pl. Opening *Markman* Brief, ECF No. 59, at 3; Case no. 6:19-cv-329-ADA, Pl. Opening *Markman* Brief, ECF No. 44, at 3. Plaintiff’s description of the claim confirms that “selectively etching back” of Step 5 must occur *after* “removing a portion of the selective growth mask layer” required by Step 4.

Second, the claim language itself mandates that Step 5 must be performed after Step 4. Step 5 requires etching back “*the exposed* top surface of the pedestal.” ’400 patent, claim 1 (emphasis added). Only Step 4 in claim 1 refers to exposing the seed area (*i.e.*, the top surface) of the pedestal. *See id.* Thus, the structure of the claim requires that Step 5, which references the

“exposed top surface,” must be performed after Step 4. If Step 5 is performed after Step 2, then the term “*the exposed* top surface” would not have any antecedent support.

Third, Step 5 explicitly recites “*selectively*” etching back the exposed top surface of the pedestal, thereby implying that it is performed after Step 4. *See id.* Selective etch requires at least two types of materials where one material is *selectively* etched relative to another material. As depicted in Figures 1D and 2F below, Step 5 selectively etches the pedestal (12 in Figure 1D and 26 in Figure 2F) relative to the selective growth mask layer 18:

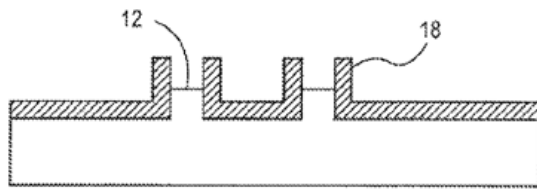


FIG. 1D

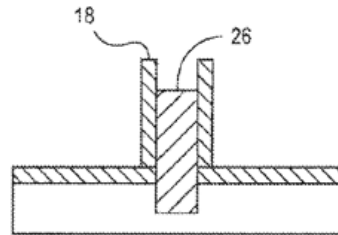


FIG. 2F

*Id.*, Figs. 1D, 2F. Step 5 cannot perform a *selective* etch before Step 3 because the pedestal 12 is the only structure present on the substrate, as evidenced in Figure 1A and Illustrative Figure 2B-1 above. *See id.*, Fig. 1A; Table 1, *supra*. Neither the claim nor the specification describe how a *selective* etch back step can be performed before Step 3 but after Step 2. Plaintiff’s construction cannot be correct as it renders the term “selectively” superfluous in Step 5 if the step is performed before Step 3. *See Digital-Vending*, 672 F.3d at 1275.

Fourth, Plaintiff relies upon a portion of the specification (’400 patent at 6:56-7:3, 7:25-36) that addresses adjusting the dimensions of the pedestal to argue that Step 5 can occur before Step 3. *See* ECF No. 34 at 13. However, Plaintiff’s assertion is based on an incorrect interpretation of the specification. When describing Figure 2, the specification discloses two distinct types of etching performed on the pedestal. As described below, the first one is reflected in Step 2 whereas the second one is captured by Step 5:

- Step 2: An etch process allows forming a pedestal depicted in Figure 2B and Illustrative Figure 2B-1 with a desired height as required by Step 2. *See* '400 patent at 6:66-67 (“[T]he pedestal 12 can be patterned to the desired final dimension during the etching step.”). The specification does not characterize this etch process as a selective etch process.
- Step 5: In contrast, the specification clarifies that the etch back performed in Step 5 after Step 4 is selective. Referring to Figure 2F, the specification states that “a further *selective etch back* of the seed material of pedestal 12 can be carried out to form the sidewall barriers 18 prior to epitaxial growth.” *Id.* at 7:25-27 (emphasis added).<sup>7</sup>

Plaintiff is mistaken in arguing that the selective etch back process of Step 5 can be employed to fashion the height of pedestal depicted in Figure 2B and Illustrative Figure 2B-1.

Finally, by arguing that Step 5 can occur before Step 3, Plaintiff is advocating a claim construction that impermissibly recaptures subject matter which Plaintiff surrendered during prosecution: growth of a heteroepitaxial layer on a seed area exposed by Step 4. Pending claim 14 lacked Step 5, and thus Step 6 was performed on the seed area exposed by Step 4. The examiner rejected that claim as anticipated by Homyk. In response, Plaintiff amended pending claim 18 and inserted the selective etch back step (Step 5) between Steps 4 and 6 to overcome the cited prior art.<sup>8</sup> *See* ECF No. 35 at 3-4; Ex. 6, ECF No. 35-6, at 5-6. Under Plaintiff’s interpretation, because Step 5 does not have to occur after Step 4, Step 6 could occur on the seed area exposed by Step 4. Plaintiff’s construction thus expands the scope of claim 1 to that of

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<sup>7</sup> Similarly, referring to Figure 1D, the specification states that “[a]fter exposing the top surface of the pedestals 12, the semiconductor material of pedestal 12 can optionally be *selectively etched back*.” *Id.* at 5:51-53 (emphasis added).

<sup>8</sup> Because Plaintiff inserted the “selectively etching back” step between Steps 4 and 6, Plaintiff envisioned that Step 5 would be performed after Step 4. *See* Ex. 6, ECF No. 35-6, at 5-6.

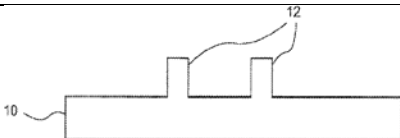
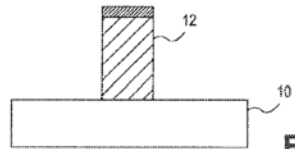
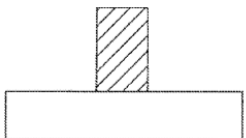
pending claim 14, a claim that was rejected by the examiner. *See Greenliant Sys., Inc. v. Xicor LLC*, 692 F.3d 1261, 1263 (Fed. Cir. 2012) (“[A] patentee is precluded from regaining the subject matter that he surrendered in an effort to obtain allowance of the original claims.”) (internal quotation marks omitted). Plaintiff should not be allowed to expand the scope of claim 1 to that of pending claim 14 under the guise of claim construction.

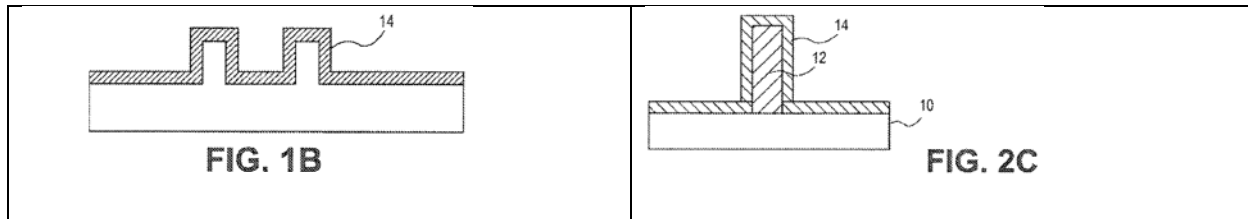
Therefore, the specification and the patent prosecution history do not support an interpretation where the “selective etching back” of Step 5 can occur before Step 3.

**5. Plaintiff’s Construction Would Improperly Exclude Embodiments in Figures 1 and 2 Based on the Agreed Construction of “seed area”**

Though Plaintiff incorrectly argues that Defendants’ construction would exclude the embodiment of Figure 2, it neglects that its proposal excludes embodiments disclosed in Figures 1 and 2 under the agreed construction of “seed area.” Both Figure 1A and Illustrative Figure 2B-1 below depict the uncovered top surfaces of pedestals 12 before they are covered with a selective growth mask layer 14 in Figure 1B and Figure 2C respectively. Heteroepitaxial growth can occur on the top surfaces of the pedestals 12 in Figure 1A and in Illustrative Figure 2B-1.

**Table 2**

Figure 1 Embodiment	Figure 2 Embodiment
 <b>FIG. 1A</b>	 <b>FIG. 2B</b>
	 <b>[Illustrative FIG. 2B-1]</b>



In the prior litigations, the Court has construed “seed area” to be “the area on which the epitaxial growth could occur,” with which the parties in this case agree. *See* Ex. 9; ECF No. 34 at 5. The uncovered top surfaces of the pedestals in Figure 1A and in Illustrative Figure 2B-1 are “seed areas” under the Court’s construction. By arguing that there is no “seed area” formed at Step 2 (corresponding to the top surfaces of the pedestals shown in Figures 1A and 2B-1), Plaintiff is relying upon a definition of “seed area” that is inconsistent with the Court’s construction of “seed area” and that excludes both of these embodiments from the scope of the claim. Therefore, Plaintiff’s proposed construction regarding the order of steps is incorrect.<sup>9</sup>

**6. Plaintiff Is Repeating Its Attempt to Construe “seed area” as an Area “on which heteroepitaxial growth starts”**

In arguing that the “forming a seed area” limitation in Step 2 “discloses *what* ultimately will be formed,” ECF No. 34 at 11 (emphasis in original), Plaintiff repeats the same argument that it made in its previous litigations against Samsung and TSMC involving the ’400 patent. To support its construction of “seed area” in the prior litigations, Plaintiff argued that “[t]he seed area is not created until the selective growth mask layer is removed.” Case No. 6:19-cv-261-ADA, Pl. Reply *Markman* Brief, ECF No. 70, at 10; Case no. 6:19-cv-329-ADA, Pl. Reply

<sup>9</sup> Plaintiff cites *Personalized User Model LLP v. Google Inc.*, No. CIV. 09-525-LPS, 2012 WL 295048, at \*28 (D. Del. Jan. 25, 2012) in which the court refused to impose an order on the steps because “limitation 1(d) [] may occur in some instances without limitation 1(b) [] having occurred.” But in this case, unlike *Personalized User Model*, it is impossible to provide a selective growth mask layer on the top surface of the pedestal in Step 3 unless a seed area is formed in Step 2, as shown in Section II.A.3 and Table 2 above. Similarly, it is impossible to selectively etch back the exposed top surface of the pedestal in Step 5 unless a selective growth mask layer is provided in Step 3 and a portion of the selective growth mask layer is removed in Step 4, as discussed in Section II.A.4.



*Markman* Brief, ECF No. 50, at 8. The Court rejected Plaintiff's construction of "seed area" in that litigation. *See Markman* Hearing Tr. (Mar. 13, 2020), ECF No. 34-3, at 28:15-38:15. As there, the Court should reject Plaintiff's argument here regarding the order of steps because it rests on the same flawed interpretation of "seed area" offered by Plaintiff.

In the prior litigations, Plaintiff argued that "seed area" should be construed as "the area on the top surface of the pedestal on which the heteroepitaxial growth starts." Case No. 6:19-cv-261-ADA, ECF No. 59, at 8; Case no. 6:19-cv-329-ADA, ECF No. 44, at 8. In support of that construction, Plaintiff stated:

Thus, according to the claim language, the "seed area" is (a) on the top surface, (b) exposed by removing a portion of the selective growth mask layer, and (c) used to grow the heteroepitaxial layer. STC.UNM's proposed construction captures these characteristics of the "seed area."

Case No. 6:19-cv-261-ADA, ECF No. 59, at 9; Case no. 6:19-cv-329-ADA, ECF No. 44, at 9.

Later, Plaintiff reiterated that the "seed area" is created only after Step 4:

Contrary to Samsung's argument (now borrowed by TSMC), a seed area is not 'created' in step one. Step one discloses the attributes that the pedestal will have. It will have a top surface, a side surface, and a seed area with particular dimensions. ***The seed area is not created until the selective growth mask layer is removed [Step 4].***

Case No. 6:19-cv-261-ADA, ECF No. 70, at 10 (emphasis added); *see also* Case no. 6:19-cv-329-ADA, ECF No. 44, at 8. In the current litigation, to justify that the second half of Step 2 is merely preamble-like language and "not a step that must be performed," Plaintiff argues again that the "seed area" is formed only after Step 4 is complete:

Step [2] discloses forming a pedestal on the semiconductor substrate having certain surfaces, including a top surface. The claim adds certain characteristics that the top surface will have, *i.e.*, a seed area with a linear surface that ranges from about 10 nm to about 100 nm. ***But step [2] does not disclose how the "seed***

*area” is formed. Rather, steps [3] and [4] are directed to the actual creation of the claimed “seed area.”*

ECF No. 34 at 11 (emphasis added).

The Court expressly rejected Plaintiff’s argument that the “seed area” is limited to an area delineated by the selective growth mask layer after Step 4 where heteroepitaxial growth *occurs*. See ECF No. 34-3 at 38:12-13 (“I’m going to maintain the Court’s construction.”). Instead, the Court construed “seed area” broadly as “the area on which the epitaxial growth *could occur*,” thereby acknowledging that “a seed area” is created by Step 2 (emphasis added). See Ex. 9. Thus, when Plaintiff argues that the “seed area” is formed by Step 4, it merely repeats the failed argument that the “seed area” is an area where heteroepitaxial growth *starts*. Plaintiff’s interpretation of the “order of steps” of claim 1 is at odds with the Court’s construction of “seed area” that both parties have adopted. Plaintiff’s arguments were rejected by the Court, and the same result is also appropriate here.

#### **7. Plaintiff’s Pending Patent Application Shows that the Order in Which the Steps Are Recited Matters**

If Plaintiff wanted certain elements of Step 2 to refer to “*what* ultimately will be formed,” they could have—and should have—drafted the claims accordingly. Indeed, Plaintiff recently submitted claims in a patent application that claims priority to the same provisional application as the ’400 patent. Ex. 10, U.S. Patent Application 16/746,853 (the “’853 application”). Table 3 below compares claim 1 of the ’400 patent with the recently submitted claim from the ’853 application, as filed on January 18, 2020. In the new claim, Plaintiff clearly seeks to move the “seed area” term from Step 2 to the “selectively etching-back” term of Step 5:

**Table 3**

Claim 1 of the '400 Patent	Claim 1 of the '853 Application
<p>A method for making a heteroepitaxial layer, the method comprising:</p> <p>providing a semiconductor substrate;</p> <p>forming a nanostructured pedestal on the semiconductor substrate, the pedestal having a top surface and a side surface, <i>the top surface forming a seed area having a linear surface dimension that ranges from about 10 nm to about 100 nm</i>;</p> <p>providing a selective growth mask layer on the top surface and side surface of the pedestal;</p> <p>removing a portion of the selective growth mask layer to expose the <i>seed area</i> of the pedestal;</p> <p>selectively etching-back the exposed top surface of the pedestal; and</p> <p>growing the heteroepitaxial layer on the seed area.</p>	<p>A method for making a heteroepitaxial layer, the method comprising:</p> <p>providing a semiconductor substrate;</p> <p>forming a nanostructured pedestal on the semiconductor substrate, the pedestal having a top surface and a side surface;</p> <p>providing a selective growth mask layer on the top surface and side surface of the pedestal;</p> <p>removing a portion of the selective growth mask layer to expose the <i>top surface</i> of the pedestal;</p> <p>selectively etching-back the exposed top surface of the pedestal <i>to form a seed area, the seed area having a linear surface dimension that ranges from about 10 nm to about 100 nm</i>; and</p> <p>growing the heteroepitaxial layer on the seed area, wherein the heteroepitaxial layer is substantially unrestricted by sidewalls during growth.</p>

See '400 patent, claim 1; Ex. 10, STC.UNM0009881, claim 1.

The mere fact that Plaintiff is seeking the above amendment underscores that Plaintiff understands—and understood during the claim construction proceedings in the prior litigations—that the scope of the claim changes when the “top surface forming a seed area” terms is moved from Step 2 to Step 5. In the current litigation, Plaintiff is attempting to change the meaning of the claims of the '400 patent through claim construction by arguing that part of Step 2 is “not a

step that must be performed” and acts like a preamble.<sup>10</sup>

**B. “growing a heteroepitaxial layer on the seed area”**

Plaintiff argues that “[t]here is no legitimate confusion about the ‘seed area’ in the claims,” which misses the point. ECF No. 34 at 14.<sup>11</sup> Although the parties agree what “seed area” means in the abstract, they disagree what “*the* seed area” in Step 6 refers to. Defendants argue that “the seed area” in Step 6 refers to the seed area formed in Step 2 and exposed in Step 4. *See* ECF No. 35 at 9-16. Claim 1 is indefinite because, as drafted, Step 6 refers to a seed area that was etched away by Step 5. On the other hand, Plaintiff believes that “the seed area” is formed by Steps 3 and 4, *see* ECF No. 34 at 11-12, but it does not reconcile the etch back (*i.e.*, removal) of “the seed area” in Step 5 with the requirement of Step 6 to grow a heteroepitaxial layer on the removed seed area.<sup>12</sup>

Nor does Plaintiff’s argument to ignore part of Step 2 remedy the indefiniteness of claim

1. Even assuming that “Steps [3] and [4] are directed to the actual creation of the claimed ‘seed

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<sup>10</sup> In contrast to its current position, Plaintiff will not deny that the term “to form a seed area” in claim 1 of the ’853 application implies that a seed area is formed as part of the step in which the term is recited and is a step that must be performed.

<sup>11</sup> Plaintiff quotes *Source Search Techs., LLC v. LendingTree, LLC*, 588 F.3d 1063, 1077 (Fed. Cir. 2009) as stating that “this court measures indefiniteness according to an objective measure that recognizes artisans of ordinary skill are not mindless automatons.” ECF No. 34 at 15. But *Source Search* was a case about whether the claim term was indefinite because it depended solely on the unrestrained, subjective opinion of a particular individual purportedly practicing the invention. *See Source Search*, 588 F.3d at 1076-77. The case is inapposite here because Defendants’ indefiniteness argument does not depend on the subjective opinion of an individual practicing the claimed invention.

<sup>12</sup> Plaintiff states that Defendants’ arguments to the PTAB in their IPR petition “undermine their indefiniteness position here.” ECF No. 34 at 15, n.2. This has no bearing on Defendants’ indefiniteness position because the petitioner in IPR may only challenge the validity of the claims based on anticipation and obviousness grounds, and may not present challenges based on indefiniteness. *See Samsung Elecs. Am., Inc. v. Prisia Eng’g Corp.*, 948 F.3d 1342, 1353 (Fed. Cir. 2020) (“[I]t does not follow that the Board may exceed its statutorily limited authority simply because an indefiniteness issue arises during claim construction. Instead, . . . Congress viewed a challenge based on indefiniteness to be distinct from a challenge based on sections 102 and 103.”).

area” as Plaintiff argues, ECF No. 34 at 11, claim 1 remains indefinite. The specification states that “[t]he seed area comprises a two-dimensional area.” ’400 patent at 3:48-49. The two-dimensional seed area purportedly formed in Step 4 is removed when the pedestal is selectively etched back in Step 5. A person of ordinary skill in the art would not know how to perform the step of “growing a heteroepitaxial layer on *the* seed area” (Step 6) when “*the* seed area” referenced in Step 6 does not exist anymore. *See* ECF No. 35 at 11-13; ’400 patent, claim 1.

The structure of claim 1 in the ’853 application reveals that Plaintiff is aware of the indefiniteness associated with claim 1 of the ’400 patent and has attempted to cure it. The new claim does not mention a “seed area” in either Step 2 or Step 4. Instead, it is first referenced in Step 5 after Step 4 has exposed a “top surface.” *See* Table 3, *supra*; Ex. 10, STC.UNM0009881, claim 1. Plaintiff attempts to bypass the patent examination process by attempting to construe claim 1 of the ’400 patent to accomplish what it desires to claim in the ’853 application. The Court should reject Plaintiff’s attempt and find the claim indefinite.

### C. “heteroepitaxial layer”

Plaintiff does not dispute that the seed area must be made of a crystalline material. *See* ECF No. 34 at 5-6. Instead, Plaintiff argues that “the notion that the ‘seed area’ is crystalline is captured by the phrase ‘crystalline structure of the seed area.’” *Id.* at 6. While this may be true if the construction is intended for an expert, a lay jury may not necessarily comprehend that a seed area with a crystalline *structure* necessarily implies that it is made of a crystalline *material*.

Plaintiff also argues that the phrase “‘different material’ in the Court’s construction refers to the ‘layer of crystalline material’ in the preceding clause rather than to the ‘seed area’ as Defendants contend.” *Id.* But Plaintiff fails to account for the grammatical structure of Defendants’ proposed construction. A statement that a grown material is “of a different crystalline material than of the seed area” denotes that both the grown material and the seed area

are made of crystalline materials. For example, stating that Fenway Park is an older baseball park than Wrigley Field denotes that both Fenway Park and Wrigley Field are baseball parks.

Because the addition of “crystalline” to the construction would only help a lay jury understand the undisputed requirement that the seed area is made of a crystalline material, Defendants request the Court to adopt their proposed construction.

**D. “selective growth mask layer”**

Plaintiff contends that Defendants’ proposed construction is unnecessary. *See* ECF No. 34 at 6-7. That is not correct. Without Defendants’ clarification, Plaintiff’s construction would be too broad. Because Plaintiff’s construction is silent regarding the areas covered by the selective growth mask layer, it could potentially encompass situations where the epitaxial growth occurs on areas covered by the selective growth mask layer in addition to growth on the exposed areas. A person of ordinary skill in the art would not understand the ’400 patent to cover such an uninhibited epitaxial growth. Defendants’ addition would eliminate that ambiguity.

Plaintiff’s argument that Defendants’ construction “could exclude from the scope of the claim the embodiment of Figure 1E” is a strawman. *See* ECF No. 34 at 7. During the meet and confer, Defendants clarified that the proposed construction does not exclude Figure 1E. Plaintiff sought the same clarification from the Court during the March 2020 Markman hearing and received the same assurance. ECF No. 34-3 at 27:19-28:5. Plaintiff’s repeated objections are based on a misunderstanding of what it means to prevent epitaxial growth. Figure 1E below is coextensive Defendants’ construction and shows that the growth of the heteroepitaxial layer 20 occurred on the portions exposed by the selective growth mask layer 14 and did not occur on portions that were covered by the selective growth mask layer 14:

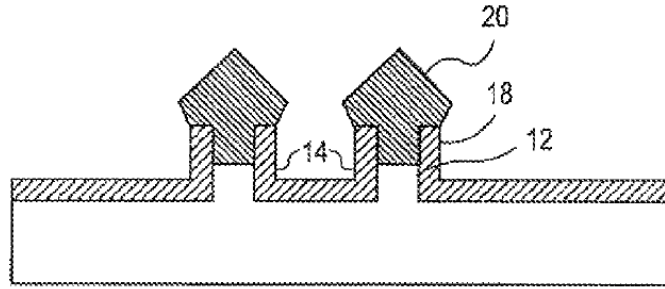


FIG. 1E

And while Figure 1E also depicts that the heteroepitaxial layer 20 laterally *overlaps* with the selective growth mask layer 14, it does not show that heteroepitaxial layer grew where the selective growth mask layer 14 covered the seed area. *See* '400 patent at 6:30-36 ("The epitaxial layer 20 can grow between and above the sidewall barriers 18, at which point the width dimensions of the heteroepitaxial layer nanostructure may increase to *overlap* the insulator, as shown, for example, in FIG. 1E.") (emphasis added). Even Plaintiff referred to growth 20 as the "lateral overgrowth of the heteroepitaxial layer" on the selective growth mask layer and that "[t]here is no growth on these sidewalls and on the shoulder." ECF No. 34-3 at 14:8-14. In fact, Figure 1E does not depict any heteroepitaxial layer on the selective growth mask layer other than the heteroepitaxial layer that grew from the pedestal. The Court stated that it "think[s] [the areas where the lateral overgrowth occurs] are exposed areas," not covered areas. *Id.* at 28:4-5. Therefore, Figure 1E simply shows that the selective growth mask layer prevents epitaxial growth *on* covered portions and permits growth *on* exposed portions. It is immaterial that it also depicts epitaxial growth occurring *over* the selective growth mask layer because Defendants' construction does not preclude that.

Plaintiff also argues that Defendants' proposed construction "would be inconsistent with the specification's express teaching of 'reduced' nucleation." ECF No. 34 at 9. But, Plaintiff itself admits that "nucleation alone would not be heteroepitaxial growth." *Id.* Therefore,

Defendants' proposed construction that the selective growth mask layer prevents epitaxial growth is not inconsistent with the specification.

Finally, Plaintiff's reliance on *GPNE Corp. v. Apple Inc.*, 830 F.3d 1365, 1372 (Fed. Cir. 2016) and *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) are misplaced. Unlike *GPNE*, the Court has not yet resolved the questions about claim scope that were raised by the parties in *this* case. Moreover, "District courts may engage in a rolling claim construction, in which the court revisits and alters its interpretation of the claim terms as its understanding of the technology evolves." *Jack Guttman, Inc. v. Kopykake Enterprises, Inc.*, 302 F.3d 1352, 1361 (Fed. Cir. 2002). Additionally, *U.S. Surgical* holds that courts need not construe every claim term where there is no material dispute as to the meaning or scope of the claims. *See U.S. Surgical*, 103 F.3d at 1568-70. That case is inapposite here because the parties do dispute the meaning of the term "selective growth mask layer."

Therefore, the Court should adopt Defendants' proposed construction.



Dated: September 25, 2020

/s/ Anupam Sharma by permission Wesley Hill

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**CERTIFICATE OF SERVICE**

I hereby certify that a true and correct copy of the above and foregoing document has been served on all counsel of record via the Court's ECF system on September 25, 2020.

/s/ Wesley Hill